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Expert Report

Assessment of the ignition hazard associated with the Powder Transfer System (PTS) manufactured by Dietrich Engineering Consultants SA, Ecublens, Switzerland

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Based on former assessments, new publications and updated guidelines [1-3] no ignition hazard has to be anticipated, when using the Powder Transfer System (PTS) manufactured by Dietrich Engineering Consultants SA for the transfer of powders of any minimum ignition energy (MIE), if all the following conditions are met:

- All conductive parts of the PTS are earthed and bonded and no insulating coatings are used.
- The transfer hose is made from dissipative material and earthed.
- The powder to be transferred is free of any flammable solvent (residual amount of flammable solvent less than 0.5% by weight).
- No vapours of flammable solvents with a concentration higher than 20 % of LEL (Lower Explosion Limit) must be sucked into the PTS together with the powder to prevent Hybrid Mixtures in the PTS.
- No pyrophoric or shock sensitive powders are used.

If the conditions mentioned above are met neither spark nor propagating brush discharges can occur. In principle cone discharges may occur in the intermediate container of the PTS, but with a maximum diameter of about 0.3 m cone discharges are very unlikely to occur and if they would occur, they would have a very low equivalent energy far below 1 mJ. Brush discharges may occur from the bulked product in the intermediate container. However, based on the present state of the art, brush discharges do not ignite dry powders in the absence of any flammable solvent vapours [2-3] independent on the minimum ignition energy (MIE) of the powder.

References

- [1] M. Glor, Report "Assessment of the explosion hazard associated with the pneumatic transport of powders as used by the PTS of Dietrich Engineering Consultants S.A." February 15th 1999, Swiss Institute for the Promotion of Safety and Security
- [2] M.Glor and K.Schwenzfeuer, Direct ignition tests with brush discharges, Poceedings of the 10th International Conference on Electrostatics organized by the European Federation of Chemical Engineering (EFCE), Espoo-Helsinki, Finland, 15 – 17 June 2005. Journal of Electrostatics 63 (2005) 463
- [3] German Guidelines TRBS 2153 "Vermeidung von Zündgefahren infolge elektrostatischer Aufladungen" Edition April 2009.

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